



OIPE

## RAW SEQUENCE LISTING

PATENT APPLICATION: US/10/091,841

DATE: 03/19/2002

TIME: 14:54:38

Input Set : N:\Crif3\RULE60\10091841.raw

Output Set: N:\CRF3\03192002\J091841.raw

1 <110> APPLICANT: Cho, Myeong-Je  
2 Del Val, Greg  
3 Caillau, Maxime  
4 Lemauz, Peggy G.  
5 Buchanan, Bob B.  
6 <120> TITLE OF INVENTION: Barley Gene for Thioredoxin and  
7 NADP-Thioredoxin Reductase  
8 <130> FILE REFERENCE: 2001-0701.30  
9 <140> CURRENT APPLICATION NUMBER: 10/091,841  
10 <141> CURRENT FILING DATE: 2002-03-05  
12 <150> PRIOR APPLICATION NUMBER: 09/540,014  
13 <151> PRIOR FILING DATE: 2000-03-31  
16 <150> PRIOR APPLICATION NUMBER: US 60/127,198  
17 <151> PRIOR FILING DATE: 1999-03-31  
18 <150> PRIOR APPLICATION NUMBER: US 60/169,162  
19 <151> PRIOR FILING DATE: 1999-12-06  
20 <150> PRIOR APPLICATION NUMBER: US 60/177,740  
21 <151> PRIOR FILING DATE: 2000-01-21  
22 <150> PRIOR APPLICATION NUMBER: US 60/177,739  
23 <151> PRIOR FILING DATE: 2000-01-21  
24 <160> NUMBER OF SEQ ID NOS: 51  
25 <170> SOFTWARE: FastSEQ for Windows Version 4.0  
27 <210> SEQ ID NO: 1  
28 <211> LENGTH: 369  
29 <212> TYPE: DNA  
30 <213> ORGANISM: Artificial Sequence  
31 <220> FEATURE:  
32 <223> OTHER INFORMATION: barley thioredoxin h cDNA  
33 <400> SEQUENCE: 1  
34 atggcggcgt cggcaacggc ggcggcagtg gcggcggagg tgatctcggt ccacagcctg 60  
35 gagcagtgga ccatgcagat cgaggaggcc aacaccgcca agaagctggt ggtgattgac 120  
36 ttcactgcat catggtgcgg accatgccgc atcatggctc cagttttcgc tgatctcgcc 180  
37 aagaagttcc caaatgctgt tttcctcaag gtcgacgtgg atgaactgaa gccattgct 240  
38 gagcaattca gtgtcgaggg catgccaaacg ttcctgttca tgaaggaagg agacgtcaag 300  
39 gacaggggtg tcggagctat caaggaggaa ctgaccgcca aggttgggct tcacgcggcg 360  
40 gccacagtaa 369  
42 <210> SEQ ID NO: 2  
43 <211> LENGTH: 122  
44 <212> TYPE: PRT  
45 <213> ORGANISM: Hordeum vulgare  
46 <400> SEQUENCE: 2  
47 Met Ala Ala Ser Ala Thr Ala Ala Ala Val Ala Ala Glu Val Ile Ser  
48 1 5 10 15

ENTERED

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49 Val His Ser Leu Glu Gln Trp Thr Met Gln Ile Glu Glu Ala Asn Thr  
50 20 25 30  
51 Ala Lys Lys Leu Val Val Ile Asp Phe Thr Ala Ser Trp Cys Gly Pro  
52 35 40 45  
53 Cys Arg Ile Met Ala Pro Val Phe Ala Asp Leu Ala Lys Lys Phe Pro  
54 50 55 60  
55 Asn Ala Val Phe Leu Lys Val Asp Val Asp Glu Leu Lys Pro Ile Ala  
56 65 70 75 80  
57 Glu Gln Phe Ser Val Glu Ala Met Pro Thr Phe Leu Phe Met Lys Glu  
58 85 90 95  
59 Gly Asp Val Lys Asp Arg Val Val Gly Ala Ile Lys Glu Glu Leu Thr  
60 100 105 110  
61 Ala Lys Val Gly Leu His Ala Ala Ala Gln  
62 115 120  
64 <210> SEQ ID NO: 3  
65 <211> LENGTH: 382  
66 <212> TYPE: DNA  
67 <213> ORGANISM: Artificial Sequence  
68 <220> FEATURE:  
69 <223> OTHER INFORMATION: wheat thioredoxin h cDNA  
70 <400> SEQUENCE: 3  
71 atggcggcgt cggcggcgac ggcgacggcg acggcgggcg cggtaggggc gggggaggtg 60  
72 atctccgtcc acagcctgga gcagtggacc atgcagatcg aggaggccaa cgccgccaaag 120  
73 aagctgggtg tgattgactt cactgcatca tggcgcgac catgccgcac tatggctcca 180  
74 attttcgctg atctcgccaa gaagttccca gctgctgttt tcctcaaggt cgacgttgat 240  
75 gaactgaagc ccattgctga gcaattcagc gtggaggcca tgccaacctt cctgttcag 300  
76 aaggaaggag atgtcaagga cagggttgtc ggagctatca aggaggaact gacgaccaag 360  
77 gttgggctac acgcgcccc ag 382  
79 <210> SEQ ID NO: 4  
80 <211> LENGTH: 127  
81 <212> TYPE: PRT  
82 <213> ORGANISM: Triticum aestivum  
83 <400> SEQUENCE: 4  
84 Met Ala Ala Ser Ala Ala Thr Ala Thr Ala Thr Ala Ala Ala Val Gly  
85 1 5 10 15  
86 Arg Gly Glu Val Ile Ser Val His Ser Leu Glu Gln Trp Thr Met Gln  
87 20 25 30  
88 Ile Glu Glu Ala Asn Ala Ala Lys Lys Leu Val Val Ile Asp Phe Thr  
89 35 40 45  
90 Ala Ser Trp Cys Gly Pro Cys Arg Ile Met Ala Pro Ile Phe Ala Asp  
91 50 55 60  
92 Leu Ala Lys Lys Phe Pro Ala Ala Val Phe Leu Lys Val Asp Val Asp  
93 65 70 75 80  
94 Glu Leu Lys Pro Ile Ala Glu Gln Phe Ser Val Glu Ala Met Pro Thr  
95 85 90 95  
96 Phe Leu Phe Met Lys Glu Gly Asp Val Lys Asp Arg Val Val Gly Ala  
97 100 105 110  
98 Ile Lys Glu Glu Leu Thr Thr Lys Val Gly Leu His Ala Ala Gln  
99 115 120 125

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Input Set : N:\Crif3\RULE60\10091841.raw

Output Set: N:\CRF3\03192002\J091841.raw

101 <210> SEQ ID NO: 5  
102 <211> LENGTH: 393  
103 <212> TYPE: DNA  
104 <213> ORGANISM: Artificial Sequence  
105 <220> FEATURE:  
106 <223> OTHER INFORMATION: wheat thioredoxin h cDNA  
107 <400> SEQUENCE: 5  
108 atggcgggcg cgggcgacggc gacgactaca gcggcgggcga cggcgggcggc ggtggggccg 60  
109 ggggaggtga tctccgtcca cagcctggag cagtggacca tgcagatcga ggaggccaac 120  
110 gccgccaaga agctgggtgt gattgacttc actgcatcat ggtgcggacc atgccgcatt 180  
111 atggctccaa tttttgctga tctcgccaag aagttcccag ctgctgtttt cctcaaggto 240  
112 gacgttgatg aactgaagcc cattgctgag caattcagcg tcgaggccat gccaaccttc 300  
113 ctgttcatga aggaaggaga cgtcaaggac agggttgtcg gagctatcaa ggaggagctg 360  
114 acgaccaagg ttgggctcca cgcggctgcc tag 393  
116 <210> SEQ ID NO: 6  
117 <211> LENGTH: 130  
118 <212> TYPE: PRT  
119 <213> ORGANISM: Triticum durum  
120 <400> SEQUENCE: 6  
121 Met Ala Ala Ala Ala Thr Ala Thr Thr Thr Ala Ala Ala Thr Ala Ala  
122 1 5 10 15  
123 Ala Val Gly Pro Gly Glu Val Ile Ser Val His Ser Leu Glu Gln Trp  
124 20 25 30  
125 Thr Met Gln Ile Glu Glu Ala Asn Ala Ala Lys Lys Leu Val Val Ile  
126 35 40 45  
127 Asp Phe Thr Ala Ser Trp Cys Gly Pro Cys Arg Ile Met Ala Pro Ile  
128 50 55 60  
129 Phe Ala Asp Leu Ala Lys Lys Phe Pro Ala Ala Val Phe Leu Lys Val  
130 65 70 75 80  
131 Asp Val Asp Glu Leu Lys Pro Ile Ala Glu Gln Phe Ser Val Glu Ala  
132 85 90 95  
133 Met Pro Thr Phe Leu Phe Met Lys Glu Gly Asp Val Lys Asp Arg Val  
134 100 105 110  
135 Val Gly Ala Ile Lys Glu Glu Leu Thr Thr Lys Val Gly Leu His Ala  
136 115 120 125  
137 Ala Ala  
138 130  
140 <210> SEQ ID NO: 7  
141 <211> LENGTH: 26  
142 <212> TYPE: DNA  
143 <213> ORGANISM: Artificial Sequence  
144 <220> FEATURE:  
145 <223> OTHER INFORMATION: primer  
W--> 146 <221> NAME/KEY: misc\_feature  
147 <222> LOCATION: (1)...(26)  
148 <223> OTHER INFORMATION: n - I  
W--> 149 <400> 7  
W--> 150 gtaaagcatt aacaacccac acattg 26  
152 <210> SEQ ID NO: 8

## RAW SEQUENCE LISTING

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Input Set : N:\Crf3\RULE60\10091841.raw

Output Set: N:\CRF3\03192002\J091841.raw

153 <211> LENGTH: 34  
 154 <212> TYPE: DNA  
 155 <213> ORGANISM: Artificial Sequence  
 156 <220> FEATURE:  
 157 <223> OTHER INFORMATION: primer  
 158 <400> SEQUENCE: 8  
 159 ccgacgccgc tgcaatcgta cttgttgccg caat  
 161 <210> SEQ ID NO: 9  
 162 <211> LENGTH: 332  
 163 <212> TYPE: PRT  
 164 <213> ORGANISM: Hordeum vulgare  
 165 <400> SEQUENCE: 9  
 166 Met Glu Gly Ser Ala Ala Ala Pro Leu Arg Thr Arg Val Cys Ile Ile  
 167 1 5 10 15  
 168 Gly Ser Gly Pro Ala Ala His Thr Ala Ala Ile Tyr Ala Ala Arg Ala  
 169 20 25 30  
 170 Glu Leu Lys Pro Val Leu Phe Glu Gly Trp Met Ala Asn Asp Ile Ala  
 171 35 40 45  
 172 Ala Gly Gly Gln Leu Thr Thr Thr Thr Asp Val Glu Asn Phe Pro Gly  
 173 50 55 60  
 174 Phe Pro Thr Gly Ile Met Gly Ile Asp Leu Met Asp Asn Cys Arg Ala  
 175 65 70 75 80  
 176 Gln Ser Val Arg Phe Gly Thr Asn Ile Leu Ser Glu Thr Val Thr Glu  
 177 85 90 95  
 178 Val Asp Phe Ser Ala Arg Pro Phe Arg Val Thr Ser Asp Ser Thr Thr  
 179 100 105 110  
 180 Val Leu Ala Asp Thr Val Val Val Ala Thr Gly Ala Val Ala Arg Arg  
 181 115 120 125  
 182 Leu His Phe Ser Gly Ser Asp Thr Tyr Trp Asn Arg Gly Ile Ser Ala  
 183 130 135 140  
 184 Cys Ala Val Cys Asp Gly Ala Ala Pro Ile Phe Arg Asn Lys Pro Ile  
 185 145 150 155 160  
 186 Ala Val Ile Gly Gly Gly Asp Ser Ala Met Glu Glu Gly Asn Phe Leu  
 187 165 170 175  
 188 Thr Lys Tyr Gly Ser Gln Val Tyr Ile Ile His Arg Arg Asn Thr Phe  
 189 180 185 190  
 190 Arg Ala Ser Lys Ile Met Gln Ala Arg Ala Leu Ser Asn Pro Lys Ile  
 191 195 200 205  
 192 Gln Val Val Trp Asp Ser Glu Val Val Glu Ala Tyr Gly Gly Ala Gly  
 193 210 215 220  
 194 Gly Gly Pro Leu Ala Gly Val Lys Val Lys Asn Leu Val Thr Gly Glu  
 195 225 230 235 240  
 196 Val Ser Asp Leu Gln Val Ser Gly Leu Phe Phe Ala Ile Gly His Glu  
 197 245 250 255  
 198 Pro Ala Thr Lys Phe Leu Asn Gly Gln Leu Glu Leu His Ala Asp Gly  
 199 260 265 270  
 200 Tyr Val Ala Thr Lys Pro Gly Ser Thr His Thr Ser Val Glu Gly Val  
 201 275 280 285  
 202 Phe Ala Ala Gly Asp Val Gln Asp Lys Lys Tyr Arg Gln Ala Ile Thr

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RAW SEQUENCE LISTING

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Input Set : N:\Crif3\RULE60\10091841.raw

Output Set: N:\CRF3\03192002\J091841.raw

```

203          290          295          300
204      Ala Ala Gly Ser Gly Cys Met Ala Ala Leu Asp Ala Glu His Tyr Leu
205          305          310          315          320
206      Gln Glu Val Gly Ala Gln Val Gly Lys Ser Asp Glx
207          325          330
209 <210> SEQ ID NO: 10
210 <211> LENGTH: 995
211 <212> TYPE: DNA
212 <213> ORGANISM: Hordeum vulgare
213 <400> SEQUENCE: 10
214      atggagggat cgcgcgcgcg gccgctccgc acgcgcgtgt gcatcatcgg cagcggcccg      60
215      gccgcgcaca cggcggccat ctacgcggcc cgcgcggagc tcaagcccgt gctcttcgag      120
216      ggctggatgg ccaacgacat cgcgcggggg ggccagctca ccaccaccac cgacgtcgag      180
217      aacttccccg gattccccac cggcatcatg ggcacgacc tcatggacaa ctgcgcgcgc      240
218      cagtcgcgtcc gcttcggcac caacatcctc tccgagaccg tcaccgaggt cgactctctc      300
219      gccgcgccct tccgcgtcac ctccgactcc accaccgtcc tcgcgcgacac cgtcgtcgtc      360
220      gccacgggcy cgtcgcgcgc cgcctccat ttctccgggt cgcgacaccta ctggaaccgc      420
221      ggcattctccg cctgcgcgtg ctgcgacggc gctgcgcgca tcttccggaa caagcccatc      480
222      gccgtcatcg gggcggtga ttccgccatg gaggaaggca acttccctac caagtacgga      540
223      tcccaagtgt acatcatcca cgggcgcaac accttcgcgc cctccaagat tatgcaggct      600
224      agggcgctct ccaatcctaa gatccaggtt gtctgggact cgaggctcgt gaggettacg      660
225      ggggtgcagg cggcggccca ttagctgggg tcaaggtcaa gaacttggtg actggtgagg      720
226      tgtctgacct tcaggtgtcc gggcttttct tcgccatcgg gcatgagcgg gccaccaagt      780
227      ttctcaatgg gcagcttgag ctccatgccg atgggtatgt ggccaccaag ccgggctcta      840
228      cacataccag tgtggagggg tctttgtctg tggagacgtg caggataaga agtatcgtca      900
229      ggccattact gctgctggat caggttgcat ggctgctttg ggacgcggag cactatctgc      960
230      aggaggtggg tgcacaggtg ggcaagtctg attga      995
232 <210> SEQ ID NO: 11
233 <211> LENGTH: 486
234 <212> TYPE: DNA
235 <213> ORGANISM: barley
236 <400> SEQUENCE: 11
237      aagctttaac aaccacaca ttgattgcaa cttagtcccta cacaagtttt ccattcttgt      60
238      ttcaggctaa caacctatac aaggttccaa aatcatgcaa aagtgatgct aggttgataa      120
239      tgtgtgacat gtaaagtga taaggtagt catgcatacc aaacctoggy atttctatac      180
240      tttgtgtatg atcatatgca caactaaaag gcaactttga ttatcaattg aaaagtaccg      240
241      cttgtagctt gtgcaaccta acacaatgtc caaaaatcca tttgcaaaag catccaaaca      300
242      caattgtaa agctgttcaa acaaacaaaag aagagatgaa gcctggctac tataaatagg      360
243      caggtagtat agagatctac acaagcaca gcatcaaac caagaaacac tagttaacac      420
244      caatccacta tgaagacctt cctcatcttt gcactcctcg ccattgcggc aacaagtacg      480
245      attgca      486
247 <210> SEQ ID NO: 12
248 <211> LENGTH: 497
249 <212> TYPE: DNA
250 <213> ORGANISM: barley
251 <400> SEQUENCE: 12
252      cttcgagtgc ccgcgcattt gccagcaatg gctaacagac acatattctg ccaaaacccc      60
253      agaacaataa tcacttctcg tagatgaaga gaacagacca agatacaaac gtccacgctt      120
254      cagcaaacag taccocagaa ctaggattaa gcogattacg cggcttttagc agaccgtcca      180

```

RAW SEQUENCE LISTING ERROR SUMMARY  
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Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:7; N Pos. 8

## VERIFICATION SUMMARY

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Input Set : N:\Crf3\RULE60\10091841.raw

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L:146 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!  
L:149 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:7  
L:150 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:7 after pos.:0